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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/770,646	02/02/2004	Caisong Zou	BYD-US2003-006	1580

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EXAMINER	
TSOY, ELENA	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/770,646	ZOU ET AL.	
	Examiner	Art Unit	
	Elena Tsoy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *17-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/2/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1-16, in the reply filed on 5/03/2006 is acknowledged. The traversal is on the ground(s) that patentably distinct species defined by the Examiner are not independent as disclosed because according to MPEP 806.04(b) species may be related inventions. Namely, species 1, claims 1-16 and species 2, claims 17-20 should be considered a single species of a common generic invention. This is not found persuasive because MPEP 806.04(b) discusses species under a claimed genus, i.e. genus is *never* a common generic invention.

The requirement is still deemed proper and is therefore made FINAL.

Specification

2. The disclosure is objected to because of the following informalities: a phrase "The surface modifying agent is one or more polymers selected from the group consisting of: coal pitch, coal tar, petroleum pitch, petroleum coke, benzene, naphthalene, *copolymers of benzene and naphthalene copolymer*, petroleum wax and petroleum resin" at page 7, lines 5-6, page 12, lines 19-20 should be corrected because: (i) benzene and naphthalene are not polymers; and (ii) meaning of "*copolymers of benzene and naphthalene copolymer*" is not clear.

Claim Objections

3. Claims 2, 12, 16 are objected to because of the following informalities: "μ m" should be changed to "μm" as conventionally used in the art.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A phrase "wherein said surface modifying agent is one or more polymers selected from the group consisting of: coal pitch, coal tar, petroleum pitch, petroleum coke, benzene, naphthalene, *copolymers of benzene and naphthalene copolymer*, petroleum wax and petroleum resin" is confusing and renders the claims indefinite because: (i) benzene and naphthalene are not polymers; and (ii) meaning of "*copolymers of benzene and naphthalene copolymer*" is not clear.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-16 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9, 11, 17-19, 21-24 of copending Application No. 10/794,020 in view of Chen et al (US 5628813) or Matsuda et al (US 20020177060). Although the conflicting claims are not identical, they are not patentably distinct from each other because fluidized bed coating graphite particles with a liquid coating material instead of stirring a mixture of the particles and liquid coating material of current invention is

another conventional technique of coating particulate substrates, as evidenced by Chen et al (See column 4, lines 14-21) or Matsuda et al (See P43).

Chen et al teach that a coating can be applied to the surface of the particulate substrate by any *known* technique which will assure *uniform* coverage and encapsulation of the substrate surface, such as by spraying the coating material in the form of a solution onto a tumbling, mobile mass of the substrate in a rotary drum or pan mixer, or by fluidized bed coating techniques (See column 4, lines 14-21).

Matsuda et al teach that coating core particles with a coating liquid may be carried out by any *conventional* method such as spray drying, immersion, powder coating, fluidized bed coating (See P43).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al (US 6403259) in view of Mao et al (US 20050247914).

The Examiner Note: order of recitation of process steps has not been given a patentable weight because claims 1 and 16 require that a method simply *comprises* recited steps without indicating any specific order of the steps.

Kitagawa et al disclose method for fabricating improved graphite granules (See column 3, lines 22-33), comprising the steps of: mixing graphite particles, a carbon precursor such as coal tar pitch, petroleum pitch (claimed surface modifying agent) (See column 5, lines 30, 35-36)

and a solvent with the use of various commercial mixing machines (See column 6, lines 8-10); heating the mixture while stirring, thereby removing the solvent and obtaining an intermediate substance (See column 6, lines 13-15); heating the mixture or intermediate substance in an inert gas atmosphere such as nitrogen gas, carbon dioxide, or argon gas, at a temperature of 700 ^{0}C or more and 2800 ^{0}C or less by increasing the temperature to a predetermined temperature *after* conducting heat treatment in a relatively low temperature region (claimed step of solidifying) (See column 6, lines 42-44) to obtain a carbonaceous substance (See column 6, lines 17-21), step of processing the carbonaceous substance into a powder, by grinding, crushing, sorting or other processing, as required (See column 6, lines 22-25). The mean particle size of the graphite powder is preferably 10 to 30 microns (See column 4, lines 59-60).

Kitagawa et al fail to teach that: (i) the carbon precursor is *dissolved* in the solvent; (ii) graphite granules are added to a formed solution of the carbon precursor; (iii) the coated graphite granules are separated from the carbon precursor solution (Claims 1, 16); (iv) the solvent is an organic solvent selected from the group consisting of: acetone, anhydrous ethanol, N-methyl pyrrolidone, chloroform, tetrahydrofuran, carbon tetrachloride, and cyclohexane (Claims 5, 16); (v) speed of mixing and duration of mixing are in the claimed range (Claims 6, 16)

Mao et al teach that a *uniform* coating of a carbon-residue-forming material such as petroleum and coal tar pitches (See P25) on graphite particles (See P24) may be obtained by forming first a *concentrated* solution of the carbon-residue-forming material in a suitable solvent, e.g. tetrahydrofuran for coal tar pitch, while controlling a ratio of the solvent to the carbon-residue-forming material in the solution and the temperature of the solution so that the carbon residue forming material completely dissolves into the solvent (See 30), adding (claimed immersing) graphite particles together and a solvent to a formed solution (See P28, P32, P33) to effect a partial precipitation of the carbon-residue-forming material onto the surface of the particles (See P32), upon completion of the precipitation step, separating the coated particles from the mixture of solvent, carbonaceous particles, and carbon residue forming material using conventional methods, such as, for example, centrifugal separation, or filtration, and *drying* the separated particles using conventional methods (See P37).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made coated graphite particles in Kitagawa et al right before the heat treatment

in a relatively low temperature region (claimed step of solidifying) using precipitation method of Mao et al with the expectation of providing the desired uniform coating of a carbon-residue-forming material, as taught by Mao et al.

As to (v), obviously, uniformity of precipitated coating would depend on mixing speed and mixing time. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant claimed parameters in Kitagawa et al in view of Mao et al through routine experimentation in the absence of showing of criticality.

As to claimed concentration limitations of claims 3, 11, 16, it is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claimed invention) in Kitagawa et al in view of Mao et al through routine experimentation in the absence of showing of criticality.

As to claimed heating speed and heat treatment duration limitations of claims 6-10, 12-16,

Kitagawa et al teach that the *heating* **speed,** cooling speed, and *heat treatment* **duration** can be freely set **depending on purposes** (See column 6, lines 40-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant claimed parameters in Kitagawa et al in view of Mao et al through routine experimentation in the absence of showing of criticality.

10. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsubara et al (US 6,733,922) in view of Mao et al, further in view of Kitagawa et al.

Matsubara et al '922 teach a method of forming a uniform amorphous carbon layer 4 on graphite particles by introducing graphite particle 2 and complex Si particles 3 into a solution of a polymer such as petroleum-based pitch, coal-based pitch or tar based materials (See column 8, lines 37-39) in an appropriate solvent (See column 12, lines 32-35), removing excess solvent thereby coating the graphite particles 2 (and the complex particles 3) with the polymer layer to provide a carbonaceous material precursor (See column 13, lines 44-50), and heat-treating the resultant carbonaceous material precursor to carbonize the polymer layer, thereby rendering an

amorphous carbon layer (See column 13, lines 58-60). It is preferred to perform the heat-treatment under an inert gas atmosphere at a temperature ranging from 800 to 1200 ^{0}C for more than 120 minutes (See column 13, lines 60-63). The oxidation of the polymer layer is prevented and the amorphous carbon layer is formed when the heating process is performed under an inert gas atmosphere (See column 13, lines 64-67). A heating temperature lower than 800 ^{0}C is not preferred since the carbonization is insufficient, and it is therefore difficult for the intercalation and deintercalation to occur. A temperature higher than 1200 ^{0}C is not preferred since the strength of the carbon layer is reduced due to progressing graphitizing of the polymer layer (See column 14, lines 1-8). A heating time less than 120 minutes is not preferred since a uniform amorphous carbon layer is not obtained (See column 14, lines 8-10). The graphite particles have particle size of 2 to 70 microns (See column 4, lines 51-53).

Matsubara et al teach that a mixture of graphite with silicon or a compound thereof has been proposed as an *alternative* to graphite since it is known to be capable of forming an alloy with lithium and providing a higher electro-capacity than that of graphite (See column 1, lines 33-44). Therefore, the method of Matsubara et al is obviously applicable to the graphite particles alone.

Matsubara et al fail to teach that: (i) the coated graphite granules are separated from the carbon precursor solution (Claims 1, 16); (ii) the solvent is an organic solvent selected from the group consisting of: acetone, anhydrous ethanol, N-methyl pyrrolidone, chloroform, tetrahydrofuran, carbon tetrachloride, and cyclohexane (Claims 5, 16); (iii) speed of mixing and duration of mixing are in the claimed range (Claims 6, 16).

Mao et al are applied here for the same reasons as above. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made coated graphite particles in Matsubara et al using precipitation method of Mao et al with the expectation of providing the desired uniform coating of a carbon-residue-forming material, as taught by Mao et al.

As to claimed mixing speed and mixing time limitations of claim 16, obviously, uniformity of precipitated coating would depend on mixing speed and mixing time. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

have determined the optimum values of the relevant claimed parameters in Matsubara et al in view of Mao et al through routine experimentation in the absence of showing of criticality.

Matsubara et al in view of Mao et al fail to teach that heating treatment has relatively low temperature region (claimed step of solidifying) (Claims 1, 16); and heating speed is in the claimed range (Claims 7, 8, 10, 13-16).

Kitagawa et al teach that heating treatment may have relatively low temperature region (claimed step of solidifying) to obtain a carbonaceous substance (See column 6, lines 17-21); and the *heating* **speed,** cooling speed, and *heat treatment* **duration** can be freely set **depending on purposes** (See column 6, lines 40-41). Kitagawa et al also teach that the carbonaceous substance can be further processed into a powder, by grinding, crushing, sorting, as required (See column 6, lines 22-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have heat treated coated particles of Matsubara et al in view of Mao et al first in relatively low temperature region followed by relatively low temperature region with the expectation of providing the desired carbonization of the coating.

As to claimed concentration limitations of claims 3, 11, 16, it is held that concentration limitations are obvious absent a showing of criticality. Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claimed invention) in Matsubara et al in view of Mao et through routine experimentation in the absence of showing of criticality.

As to claimed heating speed and heat treatment duration limitations of claims 6-10, 12-16,

Kitagawa et al teach that the *heating* **speed,** cooling speed, and *heat treatment* **duration** can be freely set **depending on purposes** (See column 6, lines 40-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant claimed parameters in Matsubara et al in view of Kitagawa et al through routine experimentation in the absence of showing of criticality.

11. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al in view of Kitagawa et al, Matsubara et al '922 and Matsubara et al '696 (US 6,589,696).

Mao et al are applied here for the same reasons as above. Mao et al teach all limitations of claimed invention except that Mao et al carry out oxidizing treatment of the carbon-residue-forming material on coated graphite particles before thermally decomposing the carbon-residue-forming material in an inert atmosphere at a carbonization temperature of 850^0C or greater temperature to form a residue, which is "substantially carbon" (See P26).

Matsubara et al '922 teach that it is preferred to perform the heat-treatment of a carbon layer precursor under an inert gas atmosphere at a temperature ranging from 800 to 1200 ^{0}C for more than 120 minutes (See column 13, lines 60-63) to form an *amorphous* carbon layer by preventing the oxidation of the polymer layer (See column 13, lines 64-67) to improve lifecycle characteristics of lithium batteries (See column 2, lines 21-24). Matsubara et al '696 teach that a carbon film in an amorphous form does not react with an electrolyte during the charge and discharge so that the decomposition of the electrolyte can be prevented, thereby improving the charge and discharge efficiency of the negative active material (See column 3, lines 19-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have carried out heat treatment of Mao et al under an inert gas atmosphere for more than 120 minutes with the expectation of providing the desired improved lifecycle characteristics of lithium batteries by forming an *amorphous* carbon layer, as taught by Matsubara et al '922 and Matsubara et al '696.

Mao et al fail to teach that heating treatment has relatively low temperature region (claimed step of solidifying) (Claims 1, 16); and heating speed is in the claimed range (Claims 7, 8, 10, 13-16).

Kitagawa et al teach that heating treatment may have relatively low temperature region (claimed step of solidifying) to obtain a carbonaceous substance (See column 6, lines 17-21); and the *heating* **speed,** cooling speed, and *heat treatment* **duration** can be freely set **depending on purposes** (See column 6, lines 40-41). Kitagawa et al also teach that the carbonaceous substance can be further processed into a powder, by grinding, crushing, sorting, as required (See column 6, lines 22-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have heat treated coated particles of Mao et al first in relatively low temperature

region followed by relatively low temperature region with the expectation of providing the desired carbonization of the coating.

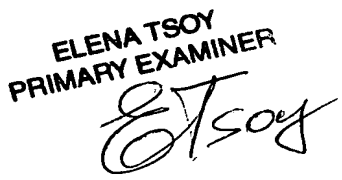
Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Thursday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy
Primary Examiner
Art Unit 1762



July 6, 2006